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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/522,572

01/28/2005

Kun-Hong Lee

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EXAMINER

QUARTERMAN, KEVIN J

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/522,572	Applicant(s) LEE ET AL.	
	Examiner Kevin Quarterman	Art Unit 2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2008 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 14 July 2008 has been entered.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10 of

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copending Application No. 10/542,378 (Lee US Pub 2006/0049742) in view of Zimmerman (US 5,397,957), as shown in Table 1.

4. This is a provisional obviousness-type double patenting rejection.

Table 1

Instant Application	10/542,378 (Lee)	Zimmerman (US 5,397,957)	Discussion of Differences
Claim 1	Claim 5	Fig. 13; col. 9, ln. 48-57	<p>Claim 5 of Lee recites an anode insulating layer with a plurality of sub-micro holes but does not recite the anode insulating layer as an alumina layer.</p> <p>Zimmerman teaches, in Figure 13, that it is known in the art to provide field emission devices with an insulating layer (15) formed on an anode electrode layer (13), the insulating layer being formed of alumina (col. 9, ln. 48-57).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an alumina layer, as taught by Zimmerman, for the anode insulating layer of Lee, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).</p>
Claim 2	Claim 5	col. 9, ln. 58-66	<p>Claim 5 of Lee recites the device having emitters but does not recite the emitters containing metal, semiconductor, or carbon material.</p> <p>Zimmerman teaches that it is known in the art to provide field emitters containing metal, semiconductor or carbon material (col. 9, ln. 58-66).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the emitters of Lee containing metal, semiconductor, or carbon material, as taught by Zimmerman, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).</p>
Claim 3	Claim 5	col. 9, ln. 58-66	<p>Claim 5 of Lee recites the device having emitters but does not recite the carbon material being selected from a group consisting of a carbon nano-fiber, a carbon nano-tube, a carbon nano-particle and amorphous carbon material.</p> <p>The Examiner notes that using the listed carbon materials in emitters are well known in the art.</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the emitters of Lee containing a carbon material selected from the group above, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).</p>
Claim 4	Claim 2 Claim 5	Fig. 13; col. 9, ln. 48-57	Same as above for claim 1
Claim 5	Claim 2	Fig. 13; col. 9,	Claim 2 of Lee recites a resistive layer positioned

	Claim 5	In. 48-57	<p>between the cathode layer and the gate insulating layer but does not recite the resistive layer containing SiO₂ or metallic oxide.</p> <p>Zimmerman teaches, in Figure 13, that it is known in the art to provide field emission devices with a resistive layer (21) containing SiO₂ or metallic oxide (col. 9, In. 48-57).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the resistive layer of Lee containing SiO₂ or metallic oxide, as taught by Zimmerman, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).</p>
Claim 6	Claim 5	Fig. 13; col. 9, In. 48-57	Same as above for claim 1
Claim 7	Claim 5	col. 9, In. 58-66	<p>Claim 5 of Lee recites the device having emitters but does not recite the emitters containing metal, semiconductor, or carbon material.</p> <p>Zimmerman teaches that it is known in the art to provide field emitters containing metal, semiconductor or carbon material (col. 9, In. 58-66).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the emitters of Lee containing metal, semiconductor, or carbon material, as taught by Zimmerman, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).</p>
Claim 8	Claim 5	col. 9, In. 58-66	<p>Claim 5 of Lee recites the device having emitters but does not recite the carbon material being selected from a group consisting of a carbon nano-fiber, a carbon nano-tube, a carbon nano-particle and amorphous carbon material.</p> <p>The Examiner notes that using the listed carbon materials in emitters are well known in the art.</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the emitters of Lee containing a carbon material selected from the group above, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).</p>
Claim 9	Claim 2 Claim 5	Fig. 13; col. 9, In. 48-57	Same as above for claim 6
Claim 10	Claim 2 Claim 5	Fig. 13; col. 9, In. 48-57	<p>Claim 2 of Lee recites a resistive layer positioned between the cathode layer and the gate insulating layer but does not recite the resistive layer containing SiO₂ or metallic oxide.</p> <p>Zimmerman teaches, in Figure 13, that it is known in the art to provide field emission devices with a resistive layer (21) containing SiO₂ or metallic oxide (col. 9, In. 48-57).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention</p>

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			was made to provide the resistive layer of Lee containing SiO ₂ or metallic oxide, as taught by Zimmerman, since it is obvious to select a known material based on its suitability for its intended use (MPEP § 2144.07).
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5. Claims 11-39 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 11-39 of copending Application No. 10/542,378 (Lee US Pub 2006/0049742) in view of Xu (US 5,872,422), as shown in Table 2.

6. This is a provisional obviousness-type double patenting rejection.

Table 2

Instant Application	10/542,378 (Lee)	Xu (US 5,872,422)	Discussion of Differences
Claim 11 Claim 26	Claim 12 Claim 15	col. 14, ln. 35-50	<p>Claim 12 of Lee recites a step of forming emitters but does not recite forming the emitter in a high electric field.</p> <p>Xu teaches that it is known in the art to form emitters in an electric field for catalytically growing emitter structures (col. 14, ln. 23-50).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the method of Lee with a step of forming the emitter in an electric field, as taught by Xu, for growing the emitter structures.</p>
Claim 12 Claim 27 Claim 28	Claim 10 Claim 12	col. 14, ln. 35-50	Same as above for claim 11
Claim 13	Claim 12	col. 14, ln. 35-50	Same as above for claim 11
Claim 14	Claim 12	col. 14, ln. 35-50	Same as above for claim 11
Claim 15 Claim 29	Claim 12 Claim 15	col. 14, ln. 35-50	Same as above for claim 11
Claim 16 Claim 30	Claim 12 Claim 15	col. 14, ln. 35-50	Same as above for claim 11
Claim 17 Claim 31	Claim 12 Claim 18	col. 8, ln. 27-36	<p>Claim 12 of Lee recites a step of forming emitters but does not recite the metal being grown by using a solution of metal sulfate, metal nitrate, or metal chloride.</p> <p>Xu teaches that it is known in the art to grow emitters using a solution of metal sulfate, metal nitrate, or metal chloride (col. 8, ln. 27-36).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the method of Lee with a step of growing the emitters using a solution of metal sulfate,</p>

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			metal nitrate, or metal chloride, as taught by Xu.
Claim 18 Claim 32	Claim 12	col. 14, ln. 35-50	Same as above for claim 11
Claim 19 Claim 33	Claim 12	col. 8, ln. 27-36	<p>Claim 12 of Lee recites a step of forming emitters but does not recite the emitters being formed by forming a carbon nano-structure.</p> <p>Xu teaches that it is known in the art to form emitters of a carbon nano-structure (col. 8, ln. 27-29).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the emitters of Lee of a carbon nano-structure, as taught by Xu.</p>
Claim 20 Claim 34	Claim 12	col. 8, ln. 64-67 col. 9, ln. 1-7	<p>Claim 12 of Lee recites a step of forming emitters but does not recite a step of forming carbon nano-structures using thermal decomposition.</p> <p>Xu teaches that it is known in the art to form carbon nano-structures using thermal decomposition (col. 8, ln. 64-67; col. 9, ln. 1-7).</p> <p>Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the method of Lee with a step of forming carbon nano-structures using thermal decomposition, as taught by Xu.</p>
Claim 21 Claim 35	Claim 12	col. 8, ln. 64-67 col. 9, ln. 1-7	Same as above for claim 20
Claim 22 Claim 36	Claim 12	col. 20, ln. 53-57	Same as above for claim 19
Claim 23 Claim 37	Claim 12	col. 14, ln. 35-50	Same as above for claim 11
Claim 24 Claim 38	Claim 12	col. 14, ln. 35-50	Same as above for claim 11
Claim 25 Claim 39	Claim 12 Claim 15	col. 14, ln. 35-50	Same as above for claim 11

Response to Arguments

7. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quarterman whose telephone number is (571)272-2461. The examiner can normally be reached on M-TH (7-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on (571) 272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin Quarterman
Examiner
Art Unit 2889

/K. Q./
Examiner, Art Unit 2889
26 September 2008

/Karabi Guharay/
Primary Examiner, Art Unit 2889